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October 6, 2011

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch
Office of the Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: LightSquared Subsidiary LLC, Application for Modification of Authority for Ancillary Terrestrial Component
IB Docket No. 11-109; IBFS File No. SAT-MOD-20101118-00239

Dear Ms. Dortch:

For your information, attached is a letter submitted by our client, Trimble Navigation Limited ("Trimble"), to the Honorable Michael Turner and Loretta Sanchez, Chairman and Ranking Member, respectively, of the Strategic Forces Subcommittee of the House Armed Services Committee, U.S. House of Representatives, following the subcommittee's recent hearing, "Sustaining GPS for National Security."

Because the letter addresses issues under consideration by the Commission, we ask that you include a copy of the letter in the record in the above-referenced proceedings.

Please direct any questions regarding this submission to the undersigned.

Sincerely,

/s/ Russell H. Fox

Russell H. Fox
Counsel for Trimble Navigation Limited

Encl.

Trimble Navigation Limited
935 Stewart Drive
Sunnyvale, CA 94085

October 6, 2011

Honorable Michael Turner
Chairman, Strategic Forces Subcommittee
House Armed Services Committee
2454 Rayburn House Office Building
Washington, DC 20515

Honorable Loretta Sanchez
Ranking Member, Strategic Forces Subcommittee
House Armed Services Committee
1114 Longworth House Office Building
Washington, DC 20515

Dear Chairman Turner and Representative Sanchez:

Following the hearing that the Strategic Forces Subcommittee held on September 15, 2011, "Sustaining GPS for National Security," Jeffrey Carlisle, Executive Vice President of LightSquared Subsidiary, LLC ("LightSquared") wrote you to "correct the record."[1/] Mr. Carlisle's letter is no correction, but instead repeats many inaccurate claims LightSquared has made in the past. Mr. Carlisle's letter argues again that LightSquared was previously authorized to provide very high powered, nationwide, terrestrial only services in the mobile satellite service ("MSS") spectrum next to GPS, and that any interference that results from these operations is therefore the fault of government users and the GPS industry because they failed to anticipate that these operations would eventually come to fruition. Based on this position, LightSquared has refused to offer more than token amounts to cover the billions of dollars of costs identified by General William Shelton that will be incurred by the United States Department of Defense ("DOD") alone to address interference created by LightSquared's proposed network. Nor has LightSquared offered anything more than token sums to the many other affected government users, businesses, and consumers.

In fact, General Shelton was absolutely correct when he testified that the January 2011 waiver decision by the International Bureau of the Federal Communications Commission ("FCC" or "Commission") would, if LightSquared is permitted to move forward, "fundamentally alter the

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1/ *See* Letter from Jeffrey Carlisle, Executive Vice President, Regulatory Affairs & Public Policy, LightSquared Subsidiary, LLC, to Honorable Michael Turner, Chairman, Strategic Forces Subcommittee, House Armed Services Committee, and Honorable Loretta Sanchez, Ranking Member, Strategic Forces Subcommittee, House Armed Services Committee (Sept. 15, 2011) ("Carlisle Letter"), *available at* http://www.lightsquared.com/wp-content/uploads/2011/09/LightSquared-Letter-to-Chairman-Turner-and-Representative-Sanchez.091511.pdf.

use of the Mobile Satellite Service band immediately adjacent to GPS L1 by allowing a ground-based 4G broadband network to become the primary user."[2/] As the proponent of a fundamentally new use of a band that would cause interference to an established and critical spectrum use, LightSquared is obligated to take all steps necessary to eliminate interference to the preexisting use. Where interference can only be eliminated by replacing affected equipment and systems, LightSquared must fully cover all costs associated with doing so. If it is unable or unwilling to bear these costs, it cannot be allowed to commence operations under the terms of the January 2011 waiver decision.

Unfortunately, in order to avoid accepting this responsibility, LightSquared has consistently questioned the bona fides, competence, and good faith of the companies that make up one of the most vibrant and innovative sectors of our economy – the many companies that make GPS products as well as the many other companies that have applied GPS technology to make business processes more efficient, less costly, and more environmentally friendly. LightSquared has now gone further. Following the Subcommittee's hearing, the principal of LightSquared's main investor, Phil Falcone, casually dismissed the testimony of General Shelton, a leading expert on GPS and its military applications, as "misinformed."[3/] This is baseless, though unfortunately typical, of LightSquared's extraordinary and expensive public relations campaign designed to mask the facts behind LightSquared's proposed deployment.

Despite LightSquared's continuing attacks and serious and substantive disagreement on many points, the government agencies that make intensive use of GPS, the GPS industry, and major companies that use GPS in their businesses, have all devoted extraordinary amounts of time and effort to working with LightSquared to determine the magnitude of threatened interference and to evaluate proposed solutions.[4/] The fact that, to date, LightSquared's proposed solutions have been found wanting not just by industry and government users, but also by the key decision makers, the FCC and the National Telecommunications and Information Administration ("NTIA"),[5/] is not evidence of lack of cooperation and diligence by GPS stakeholders. All

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[2/] *Sustaining GPS for National Security: Hearing Before the Subcomm. on Strategic Forces of the H. Comm. on Armed Services*, 112th Cong. at 3-4 (Sept. 15, 2011) (written testimony of General William L. Shelton, Commander, Air Force Space Command) ("Shelton Written Testimony"), *available at* http://armedservices.house.gov/index.cfm/files/serve?File_id=9043b110-61fa-45b9-a8ec-6c9f338981cc.

[3/] *See* Interview by Megyn Kelly with Phil Falcone, majority shareholder, LightSquared Subsidiary, LLC, in New York City, N.Y. (Sept. 30, 2011), *available at* http://foxnewsinsider.com/2011/09/19/lightsquared-founder-philip-falcone-says-he%E2%80%99s-never-met-president-obama-denies-that-network-interferes-with-military-gps-airline-safety/.

[4/] *See, e.g.*, *Status of Testing in Connection with LightSquared's Request for ATC Commercial Operating Authority*, Public Notice, FCC IB Docket No. 11-109, DA 11-1537 (rel. Sept. 13, 2011) ("For more than three months, the technical working group, comprised of more than 120 participants including representatives from the Department of Defense, Department of Transportation and other federal agencies, the GPS community, various telecommunications companies and LightSquared, conducted an extensive set of tests, . . . We appreciate the extensive resources devoted by all of the participants in the technical working group and by the federal agencies and departments.").

[5/] *See, e.g.*, *Comment Deadlines Established Regarding the LightSquared Technical Working Group Report*, Public Notice, FCC IB Docket No. 11-109, DA 11-1133, at 2 (rel. June 30, 2011) ("The [FCC-mandated] tests demonstrated potentially significant interference between LightSquared operations . . .

participants remain committed to working to find solutions, and there has been some limited progress on this front to date. If implementing any solution involves transition or replacement costs, however, as is virtually certain, LightSquared, not U.S. taxpayers, businesses, or consumers, must bear those costs.

We applaud the Subcommittee for exercising the kind of vigorous oversight that will ensure that our nation's security and private industry are protected. To support the Subcommittee's efforts, we respectfully submit this response to complete and correct the record before this Subcommittee.

General Shelton Is Correct That LightSquared Has Proposed a New and Fundamentally Different Use of the MSS Band Adjacent to GPS

LightSquared has repeated, over and over again, its self serving claims that it has been working for years on plans to build a nationwide terrestrial broadband network, that these plans were approved by the FCC years ago, and that the International Bureau's January 2011 waiver decision represented a mere "technicality" which had no effect on possible interference to GPS. Repetition cannot make these claims accurate, and they are not.

General Shelton is absolutely correct that LightSquared is the newcomer, and that approval of its plans would represent a major policy change as well as a major change in spectrum use. As such, no matter how beneficial its plans to provide new terrestrial broadband services may be in theory, as a practical matter, LightSquared must be responsible for eliminating interference to GPS, and bearing any costs incurred in doing so in order to proceed.

As an initial matter, the FCC only approved the transfer of control of the company now known as LightSquared to its current owners, a New York-based hedge fund, Harbinger Capital, in March 2010.[6/] So, references to "LightSquared's" long-planned use of the spectrum to offer terrestrial services are misleading at best. More importantly, the company Harbinger acquired and renamed (SkyTerra) held a license to use spectrum allocated for "mobile satellite service." The

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and various GPS receivers."); Letter from Lawrence E. Strickling, Assistant Secretary for Communications and Information and Administrator, National Telecommunications and Information Administration, to Julius Genachowski, Chairman, Federal Communications Commission, FCC IBFS File No. SAT-MOD-20101118-00239, at 1 (filed Jan. 12, 2011) ("[LightSquared's] proposal raises significant interference concerns that warrant full evaluation . . . the Departments of Defense, Transportation and Homeland Security have informed NTIA that they believe the FCC should defer action on the LightSquared waiver until these interference concerns are satisfactorily addressed."); *see also* Letter from Hon. James R. Schlesinger, Chairman, and Dr. Bradford Parkinson, Vice-Chairman, National Space-Based Positioning, Navigation and Timing Advisory Board (a panel of independent experts formed under the Federal Advisory Committee Act to advise the U.S. government regarding space-based positioning, navigation and timing matters), to Julius Genachowski, Chairman, Federal Communications Commission, FCC IBFS File No. SAT-MOD-20101118-00239, at 1 (filed Aug. 3, 2011) concluding that "GPS would suffer great harm from the proposed LightSquared terrestrial operation.").

6/ *See SkyTerra Communications, Inc., Transferor, and Harbinger Capital Partners Funds, Transferee, Applications for Consent to Transfer of Control of SkyTerra Subsidiary, LLC*, Memorandum Opinion and Order and Declaratory Ruling, 25 FCC Rcd 3059 (2010).

company was simply not authorized to build a nationwide terrestrial broadband network providing terrestrial only services.

Instead, dating back to 2003, the FCC has allowed MSS licensees, including LightSquared's predecessors, to use their satellite spectrum on an "ancillary" basis to provide terrestrial services in locations where the satellite could not reliably deliver a strong enough signal.[7/] This so-called "Ancillary Terrestrial Component" authorization, or "ATC" was intended to augment the primary mobile ***satellite*** service that LightSquared's predecessors were licensed to provide, not displace it, as the FCC said repeatedly over the years.[8/] The Commission also repeatedly stated that it would not allow terrestrial only services under ATC.[9/]

Even in March 2010, at the same time that it approved Harbinger's acquisition of SkyTerra, the FCC again recognized that LightSquared's predecessors did not have authority to operate a free standing, ubiquitous terrestrial network. In the *National Broadband Plan* adopted at that time, the FCC stated that ATC authorizations it had previously granted to MSS licensees "allow[ed] MSS providers to deploy terrestrial networks to enhance coverage in areas where the satellite

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7/ *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, Report and Order and Notice of Proposed Rulemaking, 18 FCC Rcd 1962, ¶ 23 (2003) ("*2003 ATC Decision*") (stating that by "filling gaps in the MSS coverage area . . . , MSS ATC should [ ] permit customers in underserved or unserved terrestrial markets to use ATC-enabled MSS handsets when in urban areas or inside buildings"); *see also Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, Notice of Proposed Rulemaking, 16 FCC Rcd 15532, ¶ 15 (2001) ("The terrestrial base stations would be integrated with the satellite network and would enable co-channel reuse of the satellite service link frequencies in adjacent satellite antenna beams to provide coverage to areas where the satellite signal is attenuated by foliage or terrain and to provide in-building coverage. . . . The satellite path would be the preferred communications link, but if the user's satellite path is blocked, the communications link would be sustained via the fill-in base stations."); *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, Memorandum Opinion and Order and Order and Second Order on Reconsideration, 20 FCC Rcd 4616, ¶ 33 (2005) ("*2005 ATC Decision*") ¶ 33 ("The purpose of ATC is to enhance MSS coverage, enabling MSS operators to extend service into areas that they were previously unable to serve, such as the interiors of buildings and high-traffic density urban areas.").

8/ *See, e.g.*, *2003 ATC Decision* ¶ 67 ("Our decision to permit MSS ATC is based upon the premise that ATC remains 'ancillary' to a fully operational space-based MSS system."); *Mobile Satellite Ventures Subsidiary LLC Application for Minor Modification of Space Station License for AMSC-1, et al.*, Order and Authorization, 19 FCC Rcd 22144, ¶ 18 (2004) ("The Commission's decision to permit implementation of MSS ATC was based on the premise that ATC must be 'ancillary' to MSS operation. To that end, the Commission established 'gating' requirements for ATC authorization and operation to ensure that ATC will augment, rather than supplant, MSS.").

9/ *See, e.g.*, *2003 ATC Decision* ¶ 1 ("We will authorize MSS ATC subject to conditions that ensure that the added terrestrial component remains ancillary to the principal MSS offering. We do not intend, nor will we permit, the terrestrial component to become a stand-alone service."); *2005 ATC Decision* ¶ 33 ("We reiterate our intention not to allow ATC to become a stand-alone system . . . We will not permit MSS/ATC operators to offer ATC-only subscriptions, because ATC systems would then be terrestrial mobile systems separate from their MSS systems.").

signal is attenuated or unavailable."[10/] The FCC further recognized that the then-current rules required MSS licensees to "integrate MSS and ATC services, including notably, a requirement that all ATC handsets must have a satellite communications capacity."[11/]

Six months after its new owners took over, in November 2010, LightSquared filed an "update" to its business plans in which it proposed for the first time to allow offerings of terrestrial only broadband services. As noted above, this was exactly what the FCC had said it would ***not*** allow when it authorized ancillary terrestrial operations. Moreover, in contrast to the statements from the *National Broadband Plan*, and as Mr. Carlisle's letter concedes,[12/] LightSquared also proposed to allow customers to buy terrestrial only handsets for the first time.

The FCC's restrictions on terrestrial use of MSS spectrum were not mere "regulatory underbrush," but were part and parcel of a longstanding spectrum allocation plan, as discussed further below, and also provided critical interference protection to GPS. When it adopted its ATC rules, the FCC recognized that terrestrial-only services would be far more attractive economically to MSS licensees than the satellite services they were authorized to provide under existing spectrum allocations, and that without rigorous safeguards, mobile satellite licensees would quickly shift their attention to terrestrial services.[13/] By building a firewall against stand-alone terrestrial services, the Commission also indirectly protected GPS from interference.[14/]

[10/] *Connecting America: The National Broadband Plan*, at 87 ("*National Broadband Plan*"), *available at* http://www.broadband.gov/download-plan/.

[11/] *Id.*

[12/] Carlisle Letter at 2 (mentioning that the FCC International Bureau's January 2011 waiver decision for the first time "allowed LightSquared to add ground-only devices" to its proposed network).

[13/] *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, Report and Order and Notice of Proposed Rulemaking, 18 FCC Rcd 1962, ¶¶ 39, 41 (2003).

[14/] These economic incentives highlight a more subtle but still very important way in which the restrictions on terrestrial use protected GPS from interference. So long as "ancillary" terrestrial operations were only permitted to "fill in" gaps in an MSS licensee's *satellite service*, an MSS licensee had to engineer any terrestrial transmitters to avoid wholesale interference with its own satellite service. By protecting its own satellite services from interference, the MSS licensee also protected GPS transmissions in the adjacent satellite spectrum. *See, e.g.*, *2005 ATC Decision* ¶ 46 (using as a premise for the adoption of certain technical rules MSS operators' "need to control self-interference sufficient[ ] to maintain satellite service"); *Impacts of the LightSquared Network on Federal Science Activities: Hearing Before the Comm. on Science, Space, and Technology*, 112th Cong. at 4 (Sept. 8, 2011) (testimony of Dr. Scott Pace, Director, Space Policy Institute, Elliott School of International Affairs, The George Washington University) ("Pace Testimony") (noting that the GPS industry's past agreements with LightSquared's predecessors were predicated on the FCC "requirement that the ATC would remain tied to satellites and that the need to avoid self-interference between the satellites and terrestrial components of the same company meant the MSS band would remain relatively quiet"). With this restriction removed, and nationwide terrestrial operations permitted, there can be no doubt that LightSquared will be mainly concerned with its more lucrative terrestrial service, removing this practical protection.

In the *National Broadband Plan*, the FCC expressly recognized that questions had been raised about whether the Commission's safeguards for terrestrial use of MSS spectrum restrictions hampered terrestrial deployments, and stated that it would work with government stakeholders and "initiate proceedings . . . immediately" to explore how it could accelerate terrestrial deployment.[15/] The FCC did not immediately institute proceedings in which it proposed to modify ATC requirements, nor does it appear that it proactively reached out to government satellite spectrum users, including government GPS users, to evaluate the implications of modifying these requirements. Instead, the issue lay dormant until LightSquared filed its November 2010 proposals, which essentially asked that the FCC modify the restrictions – the requirement of integrated satellite/terrestrial services and prohibition of terrestrial only services – that had limited ATC deployments in the past.

In other words, far from everyone knowing and believing that the current rules authorized nationwide terrestrial operations or terrestrial only services in 2005, as LightSquared suggests, it was clearly understood that the FCC's existing policies *did not* permit this, practically or legally. The U.S. government, including DOD, and the GPS industry were entitled to rely on this understanding, and did so in developing, buying, and selling tens of billions of dollars of GPS equipment. This is the "widely accepted understanding" that General Shelton referred to and which Mr. Carlisle's letter professes not to be aware of.[16/] If LightSquared's new owners are, or were, truly unaware of this understanding, they clearly failed to do adequate due diligence before acquiring SkyTerra and investing further in the business.

Given this chronology, it is clear that whatever business plans LightSquared's predecessors had been working on "for years" could only have involved "fill in" terrestrial services that were fully integrated with satellite services, because that was all that the FCC's rules and policies permitted. And what the FCC approved "years ago," a terrestrial service which "filled in" gaps in satellite service, is not what LightSquared wants to do today, which is to build a nationwide broadband wireless network with terrestrial only services in spectrum previously reserved for satellite use. If the GPS industry was on notice of anything, it was not LightSquared's new November 2010 plans, but the far more limited permitted terrestrial uses.

Once the historical record is truly "corrected," it is also clear why LightSquared's claim that the January 2011 waiver granted by the FCC's International Bureau is a mere technicality, having nothing to do with GPS interference, is also false. Allowing terrestrial-only service, the essence of the waiver, fundamentally changed the nature of permitted terrestrial operations, and dramatically expanded their scope as a practical and legal matter. It also fundamentally changed the permitted business model and incentives of the MSS licensees, in ways which reduced interference protections for GPS.

15/ *See National Broadband Plan* at 88.

16/ *See* Shelton Written Testimony at 11.

LightSquared's Selective Discussion of the Technical Terms of Its ATC Authorization Is Beside the Point

As the foregoing discussion makes clear, before January 2011, the FCC had clearly stated, and LightSquared's predecessors had accepted, that terrestrial operations in the MSS band were limited to combined or "integrated" satellite/terrestrial services accessible through handsets which could receive both sets of signals, and any terrestrial transmissions were intended to fill in the gaps in satellite coverage, and not to provide the predominant means for end users to receive broadband services. These restrictions imposed basic limits on the scope and nature of MSS licensees' terrestrial operations and related service offerings, and through the present, LightSquared and its predecessors had not seen fit to take advantage of this limited authorization to provide terrestrial services.

Against all of the evidence of what the FCC explicitly said and what it clearly intended when it authorized terrestrial operations, LightSquared points to narrow portions of the general ATC decisions where certain technical parameters of terrestrial operations (permitted number of transmitters and power levels) were modified. These specific technical rules must be viewed in the context of the broader rules and policies of which they form a small part. When LightSquared's predecessors asked for the modifications cited in Mr. Carlisle's letter, they did not say that these modifications should be adopted so that a nationwide terrestrial broadband network could be built to provide terrestrial-only services (as LightSquared is now proposing), nor could they have, because this was not allowed at the time. And the FCC, when it adopted these narrow technical parameters years ago, did not say that such parameters modified its basic policies governing operations in the band.[17/]

The bottom line is that LightSquared's suggestion that GPS manufacturers were required, starting in 2005, to start designing their equipment to accommodate eventual nationwide terrestrial operations in the MSS band has the order of priority precisely backwards. In fact, MSS licensees have always operated under various direct and indirect obligations to limit terrestrial operations and to protect GPS. When Harbinger agreed to buy out LightSquared's prior owners, it knew that the MSS spectrum was not authorized for nationwide terrestrial use, or

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[17/] For example, Mr. Carlisle's letter makes much of an FCC decision which, with minimal discussion, removed a prior license condition limiting the number of terrestrial transmitters it was permitted to deploy. *See 2005 ATC Decision* ¶¶ 48-51. As noted in the applicable paragraphs of this decision, if the FCC intended this as a major policy change authorizing nationwide, terrestrial only services, it certainly did not say that. *See id.* So long as terrestrial operations were limited to "fill in" uses, the number of terrestrial transmitters was irrelevant – the MSS licensee could deploy many low powered repeaters to fill in shaded areas in its satellite footprint and still comply with this limitation. Similarly, the fact that the FCC changed the maximum power permitted for an ATC terrestrial station did not mean that an operator could routinely operate at that power if doing so would interfere with GPS, which was prohibited by a separate rule. LightSquared also makes much of the fact that the "GPS industry" did not object to these changes. Since the FCC at the time did not purport to authorize what LightSquared is now proposing, and GPS receivers were protected in multiple other ways, there was no need for the industry to object. The obligation fell squarely on LightSquared to reasonably manage its operations to fall within all of the FCC's applicable rules and policies, not just the rules that LightSquared now wants to cherry-pick.

terrestrial only services, and it proceeded to lobby the FCC to change the rules. This process culminated in its November 2010 proposal, which represented a major change from what it had previously been allowed to do, as General Shelton correctly noted. Even the January 2011 International Bureau waiver decision makes clear that LightSquared will not be permitted to operate until interference concerns are resolved.[18/] It is time for LightSquared to stop trying to rewrite history and past decisions, and accept that, as the newcomer, it must pay the full costs of addressing any interference that results from its plans.

GPS Receivers Do Not "Encroach" on LightSquared's Spectrum and Are Designed Appropriately

LightSquared's contention that GPS receivers should have been designed differently over the last several years to avoid interference depends entirely on its inaccurate claim that the FCC authorized nationwide terrestrial service and terrestrial-only services in the MSS band in 2005. The FCC simply did not do this, and the FCC in fact had various rules and policies in place to preserve the "quiet neighborhood" in the broader satellite band which encompasses MSS and GPS. Government GPS users and the GPS industry were entitled to rely on these rules and policies, and they did so.

LightSquared has repeatedly alleged, as Mr. Carlisle's letter does, that GPS receivers somehow "encroach" or "squat" on LightSquared's spectrum.[19/] Another variant of this claim is that GPS receivers "look into" LightSquared's spectrum.[20/] This rhetoric has no basis in any commonly accepted understanding of radiofrequency engineering, and also assumes that LightSquared has a "prior right" to ubiquitous terrestrial use of its spectrum, which is not the case.

GPS receivers have been designed for decades to pick up very faint signals transmitted at very low power by satellites 12,000 miles away. GPS manufacturers have invested heavily in steady and incremental improvements in the ability of these receivers to pick up these signals and to translate them into ever more accurate location information. If a very high powered signal is transmitted in immediately adjacent spectrum, these receivers will be overloaded and cease to function. This is why high power terrestrial uses are generally located much farther away from satellite bands than the spectrum LightSquared wants to use for nationwide terrestrial use.

Revisionist history aside, GPS receivers were designed in expectation that the "quiet neighborhood" in which MSS service was originally authorized would be maintained. Limiting terrestrial operations in the MSS band was critical so that satellite receivers could continue to pick up the faint satellite signals which are common to uses of both the MSS and GPS bands. As a former senior official at the National Aeronautics and Space Administration ("NASA"), now an academic with no business interest in this matter, recently testified before the House Committee on Science, Space, and Technology, when the FCC first considered authorizing "fill

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18/ *See LightSquared Subsidiary LLC Request for Modification of its Authority for an Ancillary Terrestrial Component*, Order and Authorization, 26 FCC Rcd 566, ¶ 41 (2011).

19/ *See* Carlisle Letter at 2; Reply Comments of LightSquared Subsidiary LLC, FCC IB Docket No. 11-109, at 7, 22, 24 (filed Aug. 15, 2011).

20/ *See* Carlisle Letter at 1.

in" terrestrial use of MSS spectrum, and government users, the GPS industry, and executives of LightSquared's predecessor at the time (none of whom are with the company today) were considering initial terrestrial use proposals, it was expressly understood that the new ATC policies would not be allowed to significantly change the "quiet" nature of the mobile satellite band.[21/] This understanding was also reflected explicitly in the FCC's rules, which state that MSS licensees are obligated to cure any interference created by their terrestrial operations.[22/]

So LightSquared cannot now complain that legitimate satellite uses such as GPS somehow infringe on its "right" to exploit its spectrum as it now proposes to do – it never had such rights. LightSquared's claim of protection for its terrestrial operations against pre-existing satellite uses is particularly egregious since, as discussed below, neither LightSquared nor its predecessors paid anything remotely approaching market value, at auction or otherwise, for the right to use spectrum to provide ubiquitous terrestrial wireless services.

Mr. Carlisle has also suggested on multiple occasions that GPS receivers violate Department of Defense standards, and therefore apparently do not deserve protection from the interference that would be caused by LightSquared's operations.[23/] This is simply not true. DOD has never specified GPS receiver standards or attempted to do so. Mr. Carlisle cites as his source a DOD document, "Global Positioning System Standard Positioning Service Performance Standard."[24/] As its title suggests, the document sets forth standards for the performance of GPS satellites and related positioning services, *not* GPS receivers, as Mr. Carlisle claims.[25/]

In fact, the document explicitly states *exactly the opposite* of what Mr. Carlisle suggests, saying that the GPS receiver characteristics described in the report, "are *not* intended to impose any minimum requirements on receiver manufacturers or integrators…[r]eceiver characteristics used in this standard are required in order to establish a frame of reference in which the SPS [Standard Positioning Service] performance can be described."[26/]

In other words, the report describes a reference receiver as the "baseline" for the limited purpose of defining the performance of the GPS satellites and related positioning services in relation to a specific, defined receiver, not as a "technical standard" for *all* GPS receivers, irrespective of

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21/ Pace Testimony at 2 ("The key point is that the entire 'neighborhood' is oriented to satellite services and such services require 'quiet' spectrum as the powers of signals transmitted from space are many orders of magnitude weaker than those transmitted by typical terrestrial stations.").

22/ 47 C.F.R. § 25.255 ("If harmful interference is caused to other services by ancillary MSS ATC operations, either from ATC base stations or mobile terminals, the MSS ATC operator must resolve any such interference.").

23/ *See* Carlisle Letter at 3; *see also* Letter from Jeffrey Carlisle, Executive Vice President, Regulatory Affairs & Public Policy, LightSquared Subsidiary, LLC, to Julian Genachowski, Chairman, Federal Communications Commission, FCC IB Docket No. 11-109, at 1-2 (filed Oct. 3, 2011).

24/ *See* Carlisle Letter at 3.

25/ *See* Dept. of Defense, Global Positioning System Standard Positioning Service Performance Standard (4th ed. 2008).

26/ *Id.* at 7.

their intended use. Manufacturers are free to design GPS receivers as they see fit for whatever applications they wish to support. This should not be surprising – it makes no sense that DOD would even try to suggest, much less specify, standards for hundreds of millions of GPS receivers, the overwhelming majority of which are used for civilian – not military – purposes.

LightSquared Is Directly Responsible for Interference to High Precision GPS Receivers, But Still Refuses to Pay the Costs of Replacing These Receivers If and When New Technology Becomes Available

LightSquared's suggestions that GPS receivers are poorly designed and make "inappropriate" use of its MSS spectrum are not only wrong for the reasons set forth above, but are particularly disingenuous when it comes to high precision GPS receivers. Mr. Carlisle's letter fails to disclose that many high precision GPS receivers were in fact designed to receive signals in the MSS band to take advantage of satellite "augmentation" services that LightSquared itself provides, as does the other licensee in the MSS band, Inmarsat. These services provide additional satellite signals that can be used in conjunction with GPS signals to significantly improve the accuracy of the location information generated by the device. Mr. Carlisle also fails to disclose that LightSquared's own contracts with satellite customers reserve the right to transmit signals anywhere in the entire MSS band upon notice, so GPS receivers which use LightSquared MSS services had to be designed to receive signals in the entire MSS band.

Thus, as a result of LightSquared's own services and contractual requirements, high precision receivers will receive "in band" interference[27/] no matter where LightSquared transmits in its MSS spectrum, making such receivers far more vulnerable to overload by LightSquared's proposed operations. This also means that LightSquared's proposal to use the "lower" portion of its MSS spectrum is not a solution for these receivers, a fact that LightSquared acknowledges in front of technically competent audiences, though not in its glossy ads or its sweeping and irresponsible generalizations about "defective" GPS receivers.

Government and private users have invested billions of dollars in GPS equipment designed in this manner, and they are in common use in critical economic sectors including construction and agriculture. Mr. Carlisle's letter even acknowledges that three quarters of the high precision receivers tested would receive overload interference, even after all of LightSquared's mitigation proposals are taken into account.[28/] Even if new technology becomes available that can

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27/ Much of the discussion of interference to date has focused on interference from LightSquared's high powered transmissions due to overload of sensitive receivers that are built to receive signals in the GPS spectrum adjacent to LightSquared's MSS spectrum, which takes place even if LightSquared is transmitting only within its own spectrum band. In other words, this interference is caused "out of band" relative to LightSquared's authorized frequencies. In the case of high precision receivers, which have been designed to receive additional services transmitted by LightSquared and Inmarsat in the MSS band, these receivers will suffer interference from terrestrial transmissions in the same band they are designed to receive, an even more intractable interference problem. In addition, LightSquared's simplistic and inaccurate claim that GPS receivers "squat" on LightSquared's spectrum or "inappropriately violate" LightSquared's spectrum rights have no applicability to these receivers since they "look into" LightSquared's frequencies to receive services LightSquared itself provides.

28/ *See* Carlisle Letter at 3.

withstand interference generated by LightSquared's lower band operations, hundreds of thousands of receivers already in the field will still receive devastating interference. LightSquared is clearly responsible for this problem but has refused to accept the responsibility to bear the full costs to replace this equipment. It must be required to bear all such costs.

Mr. Carlisle also continues to understate the size of the high precision market and, therefore, the scope of the problem of resolving interference to GPS devices. He says that there are fewer than 500,000 precision receivers that would be affected by the interference caused by LightSquared.[29/] That estimate is off base. Data compiled from public analyst reports shows that approximately 769,000 GPS receivers have been sold in the last five years alone in the categories of construction machine control, precision agriculture, and survey and mapping, which are just a few examples of high precision applications.[30/] This data has been available to LightSquared since it was first published in the NDP Consulting study in June, yet it continues to ignore it, without citing any alternative data to support Mr. Carlisle's estimates.

LightSquared's Revisionist History Is Clearly Calculated Either to Hide or Justify a Multi-Billion Dollar Spectrum Windfall for Its Owners

LightSquared's claim that it was authorized to provide nationwide, terrestrial only broadband service in 2005 (or 2003, as it has claimed elsewhere) is clearly intended to obscure another highly problematic aspect of its proposals. If, as the actual record establishes, the International Bureau's January 2011 decision sanctioned for the first time a fundamental change in MSS spectrum use from primarily satellite use to primarily terrestrial use, LightSquared's owners would receive a massive and unjustified windfall due to the dramatic change in the value of the spectrum that would result from the decision. With this prize within reach, it is certainly understandable why LightSquared is so desperately trying to rewrite history. These efforts notwithstanding, this windfall can and should be reclaimed from LightSquared for the benefit of the U.S. Treasury.

In a study submitted to the FCC, which purported to estimate the economic benefits of its broadband proposal, LightSquared's own consultants concluded that satellite spectrum, like that originally granted to LightSquared's predecessors, is currently worth approximately $2 billion dollars, if it is limited to satellite use.[31/] This same report, however, estimated that LightSquared's mobile satellite spectrum is worth $12 billion if it can be used for unrestricted terrestrial mobile broadband services, a difference of $10 billion.[32/]

29/ *See id.* at 4.

30/ *See* Nam D. Pham, Ph.D., *The Economic Benefits of Commercial GPS Use in the U.S. and the Costs of Potential Disruption*, NDP Consulting, at 5 (June 2011) ("NDP Consulting Study"), attached as Exhibit A to Comments of Trimble Navigation Limited, FCC IB Docket No. 11-109 (filed Aug. 1, 2011) (citing data from public analyst reports).

31/ *See* Coleman Bazelon, The Brattle Group, Inc., *GPS Interference: Implicit Subsidy to the GPS Industry and Cost to LightSquared of Accommodation*, at 1 n.2, 8-9 (June 22, 2011) ("Brattle Group Study"), *available at* http://www.brattle.com/_documents/UploadLibrary/Upload957.pdf.

32/ *See id.* at 1 n.2. LightSquared may have done even better than that – according to LightSquared's Jeffrey Carlisle in a March 4, 2011 *Space News International* story, LightSquared has spent "several

This estimate is in line with auction results over the last several years. For example, when the FCC in 2008 auctioned 700 MHz spectrum licenses covering the entire country for terrestrial broadband use, it generated approximately $19.6 billion for the U.S. Treasury.[33/] Similarly, the auction for Advanced Wireless Service ("AWS") spectrum raised approximately $13.7 billion in 2006.[34/]

Since 1993, our nation's scarce spectrum resources have been auctioned to the highest bidder, with the proceeds going to the U.S. Treasury. However, the mobile satellite spectrum that Harbinger Capital acquired when it bought out LightSquared's predecessor in March 2010 was originally awarded for free in 1989.[35/]

This does not mean, however, that LightSquared is entitled to pocket the increase in spectrum value resulting from the change in use it has sought from the FCC. To the contrary, the clear intent of prior Congressional enactments is that private parties should pay the market value of the spectrum they acquire. In similar circumstances, when the FCC has changed spectrum uses in a way that increases the value of the affected spectrum, it has not allowed the incumbent licensee to hold onto its spectrum and reap the benefit of the higher value of the re-purposed spectrum. For example, the recently auctioned 700 MHz spectrum was reclaimed from broadcasters, but they were not allowed to hold their spectrum to provide wireless service – that spectrum was reclaimed and auctioned. The FCC also reclaimed and auctioned spectrum from microwave licensees to make it available for AWS licensees who provide mobile phone services. Microwave licensees were not permitted to simply hold onto their spectrum to provide terrestrial wireless services.

The FCC is actively considering whether to allow other MSS licensees – in the 2 GHz band – to offer terrestrial services, but at a cost to those licensees designed to recapture the increase in spectrum value.[36/] The Obama Administration has also recognized that MSS licensees should not get a windfall by re-purposing MSS spectrum for terrestrial use by requiring, in the American Jobs Act, that the FCC recover the value of any spectrum so converted.[37/]

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hundreds of millions" of dollars on spectrum. *See* Peter B. de Selding, *LightSquared Plans Hinge on Outcome of GPS Interference Debate*, SPACE NEWS INT'L, March 4, 2011.

33/ *See Auction of 700 MHz Band Licenses Closes*, Public Notice, 23 FCC Rcd 4572, ¶ 2 (2008).

34/ *See Auction of Advanced Wireless Services Licenses Closes*, Public Notice, 21 FCC 10521 (2006).

35/ *See Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services, et al.*, Memorandum Opinion, Order and Authorization, 4 FCC Rcd 6041 (1989), *remanded by Aeronautical Radio, Inc. v. FCC*, 928 F.2d 428 (D.C. Cir. 1991), *Final Decision on Remand*, 7 FCC Rcd 266 (1992), *aff'd, Aeronautical Radio, Inc. v. FCC*, 983 F.2d 275 (D.C. Cir. 1993).

36/ *See Spectrum Task Force Invites Technical Input on Approaches to Maximize Broadband Use of Fixed/Mobile Spectrum Allocations in the 2 GHz Range*, Public Notice, FCC ET Docket No. 10-142, FCC WT Docket Nos. 04-356, 07-195, DA 11-929 (rel. May 20, 2011).

37/ *See* American Jobs Act of 2011, § 274 (Sept. 12, 2011), *available at* http://www.whitehouse.gov/sites/default/files/omb/legislative/reports/american-jobs-act.pdf.

The FCC inexplicably has not addressed the possibility of LightSquared reaping this windfall, or the requirements of existing auction statutes as applied to any broader authorization of terrestrial activities in the MSS band. When the FCC first authorized limited terrestrial operations by MSS licensees, as described above, it relied on these limits to support a finding that the auction requirements of Section 309(j) of the Communications Act did not apply.[38/] Given the dramatic expansion of terrestrial authority granted under the January 2011 waiver, and the massive increase in spectrum value that would result from this action, the Commission's conclusion is no longer supportable and must be revisited. If the FCC fails to address this, Congress should step in and ensure that the U.S. Treasury, not LightSquared, receives the value of repurposed satellite spectrum.

As a final note, LightSquared's own spectrum value estimates also belie its claim that it was authorized to provide nationwide terrestrial only services in 2005. If this were the case, it meant that LightSquared's predecessor had spectrum as of 2005 that was worth billions of dollars more than they had paid for it, yet Harbinger Capital was able, in 2010, to buy the company out at a massive discount to the value of their spectrum assets. Again, the overwhelming evidence is that LightSquared and its predecessors were never authorized to do what LightSquared is proposing to do today. If LightSquared is allowed to move forward, the FCC and Congress must not only prevent LightSquared from interfering with GPS, but must also prevent LightSquared's hedge fund owners from receiving an unjustified windfall at the expense of U.S. taxpayers.

More Tests Are Necessary

Mr. Carlisle says that General Shelton's criticism is not based on LightSquared's latest proposal to use only the "lower 10 MHz" of its allocated spectrum and that all information necessary for

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38/ In the *2003 ATC Order*, the FCC considered whether the grant of terrestrial rights under MSS licenses triggered statutory requirements to conduct an auction for these rights in which other parties could participate. The FCC concluded that the initial limited grant of terrestrial rights to MSS licensees did not trigger these requirements, stating that:

> We are also not persuaded that allowing MSS operators to incorporate ATCs without going through a competitive bidding process is inequitable to CMRS carriers or will unjustly enrich those MSS operators such that we must treat the modifications of their authorizations as initial licenses. The modifications we permit today may indeed make MSS licenses more valuable. However, *given the strict limitations we are placing on ATC authority*, and the significant costs of launching and maintaining satellite operations, we do not believe that such added value will rise to a level that constitutes unjust enrichment or requires that we consider the modification of MSS licenses to include ATC authority as the assignment of initial licenses.

2003 ATC Order ¶ 226. The "strict limitations" that the FCC relied upon were the gating criteria limiting ancillary operations referred to above, and the Commission made specific reference to its requirement that an MSS licensee "offer ATCs on a commercially bundled basis with MSS, including offering satellite-capable equipment at the point of sale." *Id.* ¶ 225. Since this requirement would be modified if LightSquared is permitted to operate under the International Bureau's January 2011 waiver decision, and given the dramatic increase in value of the spectrum if authorized for ubiquitous terrestrial use, the FCC would be required to revisit its conclusion that auction requirements do not apply.

DOD to analyze LightSquared's new plan has been made available.[39/] NTIA and the FCC plainly disagree with LightSquared. Both have said that more testing of GPS devices in the presence of signals from only LightSquared's lower 10 MHz of spectrum is required.[40/] In fact, NTIA has specifically directed DOD and the Department of Transportation to cooperate with LightSquared in more testing of federal government use of GPS general location and navigation devices by November 30.[41/] Even when that testing is over, NTIA's analysis will be incomplete. As Mr. Strickling's letter indicates, further analysis of high precision and other devices will still be required.[42/]

Cost Impact

Mr. Carlisle's letter attempts to minimize the impact on the United States economy of the disruption to GPS reception from the interference that will be caused by LightSquared. He asserts that because the NDP Consulting study, which shows the devastating impact on commercial users and manufacturers, was sponsored by the Coalition to Save Our GPS, it should not be viewed as "unbiased."[43/] Dr. Pham is a respected economist and compiled his results using a clearly stated methodology and data from public sources, including U.S. government statistics. Mr. Carlisle offers no criticism of the study's methodology and fails to show where the NDP Consulting results are wrong.

In any case, there can be no serious argument that GPS is not a critical sector of our economy. As the NDP Consulting study shows, GPS is essential to economic activity between $68 billion and $122 billion per year,[44/] and "an estimated $3 trillion worth of commerce relies on GPS for tracking, timing and navigation" worldwide.[45/] Again, LightSquared should not be allowed to

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39/ *See* Carlisle Letter at 2-3.

40/ *See Status of Testing in Connection with LightSquared's Request for ATC Commercial Operating Authority*, Public Notice, FCC IB Docket No. 11-109, DA 11-1537 (rel. Sept. 13, 2011); Letter from Lawrence E. Strickling, Assistant Secretary for Communications and Information, U.S. Department of Commerce, to Julius Genachowski, Chairman, Federal Communications Commission, FCC IB Docket No. 11-109 (filed Sept. 13, 2011) ("NTIA Letter") (requesting that the Executive Steering Group of the interagency National Executive Committee for Space-Based Positioning, Navigation and Timing (ExCom) work with LightSquared to develop a joint testing plan to validate data on the performance of cellular and personal/general navigation GPS receivers in light of LightSquared's modified proposal to confine its operations to the lower 10 MHz signal).

41/ *See* NTIA Letter at 2.

42/ *See id*.

43/ *See* Carlisle Letter at 4.

44/ *See* NDP Consulting Study at 1. In contrast, LightSquared's competing study, prepared by an individual in a consulting group that has worked for LightSquared in the past, with no reported academic credentials as an economist, estimates the total economic benefits of its proposal at $120 billion in total, for all time. Brattle Group Study at 1. And even this much lower estimate is based on two sentences in a footnote with a cursory citation to an academic article, with no supporting analysis whatsoever. *See id.* at 1 n.2.

brush aside the economic costs of its proposal. If it has alternative estimates of these costs, it should offer them. And it should unequivocally commit to bearing them.

Adverse Effect on our Nation's Military Forces

Putting technical rules, past actions, and the entire commercial GPS enterprise aside, the paramount issue facing Congress is the potential for LightSquared's proposed operations to damage national security. All other issues are secondary. If the nation improves domestic broadband services at the expense of national security, that would directly affect the safety of our nation's airmen, marines, sailors, and soldiers when we ask them to conduct hazardous combat missions.

General Shelton testified before your Subcommittee "I would put GPS in the category of critical infrastructure for the United States."[46/] As stated during the hearing, on two occasions earlier this year, the Deputy Secretary of Defense personally wrote to the FCC Chairman to raise serious concerns about the LightSquared proposal and the FCC conditional waiver allowing it to move forward. It is also worthwhile to note that General Shelton is our nation's most senior official responsible for oversight of the national Global Positioning System, and that the concerns he raised to the Subcommittee in classified briefings and public testimony were not prompted by anyone in the GPS industry, but rather stem directly from DOD's own independent and comprehensive technical analysis. Finally, as General Shelton indicated in his testimony before your Subcommittee, DOD's concerns with any configuration of the LightSquared proposal include adverse effects to systems other than GPS, such as INMARSAT for data and voice communications.

Overwhelming evidence suggests that DOD is not being alarmist in its concerns about LightSquared's impact on DOD systems. General Shelton estimates that "[t]here are probably a million GPS receivers out there in the military, maybe even more than that."[47/] These impacts have been corroborated by other government witnesses in reference to other critical missions.[48/]

[45/] *GPS Reliability: A Review of Aviation Industry Performance, Safety Issues and Avoiding Potential New and Costly Government Burdens Before the Subcomms. on Aviation and Coast Guard and Maritime Transportation of the H. Comm. On Transportation and Infrastructure*, 112th Cong. at 1 (June 23, 2011).

[46/] *Sustaining GPS for National Security: Hearing Before the Subcomm. on Strategic Forces of the H. Comm. on Armed Services*, 112th Cong. at *5 (Sept. 15, 2011) (oral testimony of General William L. Shelton, Commander, Air Force Space Command) ("Shelton Oral Testimony"), *available at* http://findarticles.com/p/news-articles/political-transcript-wire/mi_8167/is_20110916/rep-michael-turner-holds-hearing/ai_n58165676/.

[47/] Shelton Oral Testimony at *11.

[48/] In addition to the concerns raised during your recent Subcommittee hearing, federal agency representatives participating in the hearing regarding LightSquared conducted by the Committee on Science, Space, and Technology earlier this month expressed additional significant concerns. *See, e.g.*, *Impacts of the LightSquared Network on Federal Science Activities: Hearing Before the Comm. on Science, Space, and Technology*, 112th Cong. at 2 (Sept. 8, 2011) (testimony of Mary M. Glackin, Deputy Under Secretary for Operations, National Oceanic and Atmospheric Administration, U.S. Dep't of Commerce) ("concluding that LightSquared's plans "would cause serious performance degradation or a

Teresa M. Takai of the U.S. Department of Defense testified that "GPS stands as the cornerstone of the DOD PNT capability."[49/] GPS is vital to national security and is relied upon by our service men and women for a wide array of capabilities. Simply put, GPS is "integrated into almost every aspect of U.S. military operations." [50/]

Nor is there a clear path to remediate the interference that LightSquared is expected to cause. General Shelton testified that "to our knowledge thus far there are no mitigation options that will be effective in eliminating interference to essential GPS services in the United States."[51/] His testimony on the lack of known interference mitigation is corroborated by every other federal witness who has testified before a Congressional Committee this year on the subject.[52/]

During his testimony before your Subcommittee, General Shelton stated that if some kind of filter solution is technically feasible, "we would have to thoroughly test it. We might even have to do software modifications to accommodate it. I mean, there's just a whole bevy of questions that are unanswered at this point."[53/] He also testified, "Every precision receiver would have to be retrofitted. How that might affect the overall platform that it's on is an unknown."[54/]

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total loss of mission for a wide range of our operational systems, resulting in the loss of critical services and potential loss of life and property."); *Impacts of the LightSquared Network on Federal Science Activities: Hearing Before the Comm. on Science, Space, and Technology*, 112th Cong. at 4 (Sept. 8, 2011) (testimony of Victor D. Sparrow, Director, Spectrum Policy and Planning Division, Human Exploration and Operations Mission Directorate, National Aeronautics and Space Administration) ("NASA Testimony") ("Impacts to NASA's GPS-dependent systems from interference created by the network would be substantial, impacting airborne and spaceborne science, as well as certain space operations."); *Impacts of the LightSquared Network on Federal Science Activities: Hearing Before the Comm. on Science, Space, and Technology*, 112th Cong. at 1 (Sept. 8, 2011) (opening statement of Hon. Ralph Hall, Chairman, House Comm. on Science, Space, and Technology) (stating that the Federal Aviation Administration estimates that LightSquared's proposal "would result in billions of dollars of investment lost, a decade of delays to ongoing projects, a cost impact of roughly $72 billion, and almost 800 additional fatalities.").

49/ *Sustaining GPS for National Security: Hearing Before the Subcomm. on Strategic Forces of the H. Comm. on Armed Services*, 112th Cong. at *5 (Sept. 15, 2011) (oral testimony of Teresa M. Takai, Chief Information Officer, U.S. Department of Defense), *available at* http://findarticles.com/p/news-articles/political-transcript-wire/mi_8167/is_20110916/rep-michael-turner-holds-hearing/ai_n58165676/.

50/ *Id.*

51/ Shelton Oral Testimony at *5.

52/ *See, e.g.*, NASA Testimony at 4 (noting that none of the mitigation options proposed "have yet been demonstrated to be effective" and that adequate filters "have yet to be designed or are theoretical or speculative in nature"); *Impacts of the LightSquared Network on Federal Science Activities: Hearing Before the Comm. on Science, Space, and Technology*, 112th Cong. at 1 (Sept. 8, 2011) (testimony of Dr. David Applegate, Associate Director for Natural Hazards, U.S. Geological Survey, U.S. Dep't of the Interior) ("Testing performed this year on LightSquared's original deployment plan has failed to demonstrate the satisfactory effectiveness of mitigation techniques.").

53/ Shelton Oral Testimony at *11-12.

54/ *Id.* at *10.

As Members of your Subcommittee are well aware, the Department of Defense does not place any new equipment on its weapon system platforms and then go directly into combat without first conducting comprehensive test, evaluation, and certification programs. Even if an effective filter could be developed and even if it were itself an inexpensive item, DOD would still have to conduct tests not only of the filter, but also of: the modified GPS receiver; the effectiveness of the modified navigation system and its effect on other platform subsystems such as radars, communications systems, electronic warfare systems, weapons mounted on the platform, and ejection systems in the case of fighter aircraft; interfaces to each weapon carried by and launched from the platform; performance of each of the weapons launched from such platforms; and crew safety.

Such testing and weapon system recertification would be required for *every* class of ground vehicle, helicopter, tactical aircraft, strategic bomber, and ship in the DOD inventory. This would affect assets of the Army, Navy, Air Force, Marine Corps, Special Operations Command, and Guard and Reserve units in every State. Each of these weapon systems would have to be recertified in terms of electromagnetic interference, safety, and system performance. In the case of tactical fighters, this could involve flight tests of both aircraft and each individual weapon carried on the aircraft. This would apply also to each model of the weapon system in the inventory. In the case of the F-16 aircraft, as just one example, testing would include new model aircraft in the Air Force, older model aircraft in the National Guard, and aircraft owned and operated by NATO and other allies which fly F-16s since there are thousands of F-16s throughout the world that use GPS for navigation and for accuracy of weapons. General Shelton specifically mentioned in his testimony the risk to timing within DOD computer networks, and that "clearly we count on GPS precision as one of our key tenets of command and control."[55/] Testing and recertification requirements would extend well beyond just weapons and weapon systems.

Not surprisingly, as a consequence of the normal DOD weapon system safety and system performance certification process, the costs to DOD for retrofitting a million or more GPS precision receivers would be enormous. It is not simply the cost of purchasing filters, but rather the extensive testing, integration design, software upgrade, weapon system recertifications, flight tests, payments to weapon system contractors, conducting new competitions with vendors for design and installation work, and hardware procurement and checkout costs for every ground vehicle, aircraft, ship, and each of the smart weapons that would drive cost to DOD through the roof. During testimony before your Subcommittee, General Shelton characterized this by saying that "the cost would be in the billions of dollars. We believe that the timing would probably be a decade or more to accomplish all this."[56/]

Most troubling is General Shelton's conclusion that even with the "enormous cost, time, integration and testing to thoroughly wring out these filters, if they're technically feasible. . . . [w]*e believe that the precision of those receivers would be impacted even in the presence of that filter.*"[57/] He further testified, "Clipping off those harmonics decreases the accuracy of the

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[55/] *Id.* at *15.

[56/] *Id.* at *11.

[57/] *Id.* at *10.

receiver. If there's something else magic out there, we don't know about it."[58/] This means that if the FCC allows LightSquared to proceed with its terrestrial network and even if an effective filter could be developed, *DOD would spend billions of dollars and a decade to dumb down its entire GPS receiver inventory*. In this austere budget environment, it would have to cut billions of dollars from readiness and modernization accounts to find an offset for this unplanned, unprogrammed, unnecessary, and unwarranted expense.

Finally, General Shelton emphasized the strategic goal of ensuring that the United States must continue to lead the world in Precision, Navigation, and Timing services. If the FCC proceeds with the LightSquared system at the expense of our nation's GPS system, we are blinding ourselves and ceding world leadership in Precision, Navigation, and Timing services to Europe, Russia, and China.

Because of the DOD concerns, validated by its own independently conducted and rigorous testing and analysis at the classified level, both the House and Senate Armed Services Committees each have addressed the LightSquared issue in their National Defense Authorization Act 2012 legislation.[59/] Recently the press has characterized the issue as being one between political parties,[60/] but that is not accurate. Members of Congress in both political parties and in both chambers of Congress have responded on a bipartisan basis to DOD concerns and the possible severe adverse impact to our nation's military forces resulting from interference from LightSquared to the national GPS system. As Representative Sanchez noted during the hearing "I actually support the increase and improvement of broadband service, but not at the expense of national security."[61/] Your Subcommittee and its members from both parties should be commended both for your leadership in conducting an impartial hearing with a number of witnesses from the Administration and for including legislation in your fiscal year 2012 bill to ensure that the FCC process does not inadvertently result in a catastrophic risk to the ability of U.S. forces to conduct global military combat missions or to the safety of the brave men and women in our military forces who conduct them.

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58/ *Id.*

59/ *See* National Defense Authorization Act for Fiscal Year 2012, H.R. 1540, 112th Cong. (2011).

60/ *See, e.g.*, Adam Bender, Tim Warren, *Commerce Committees Keeping Tabs on LightSquared Behind the Scenes*, COMM. DAILY, at 6-7 (Sept. 22, 2011) (noting the "political nature" of the LightSquared matter); Michael Grotticelli, *LightSquared Says It Can Eliminate All GPS Interference*, BROADCAST ENGINEERING (Sept. 26, 2011) (referring to the LightSquared issue as a "political battle").

61/ *Sustaining GPS for National Security: Hearing Before the Subcomm. on Strategic Forces of the H. Comm. on Armed Services*, 112th Cong. at *3 (Sept. 15, 2011) (oral testimony of Rep. Sanchez, Ranking Member, House Armed Services Committee Subcommittee on Strategic Forces), *available at* http://findarticles.com/p/news-articles/political-transcript-wire/mi_8167/is_20110916/rep-michael-turner-holds-hearing/ai_n58165676/.

I appreciate this opportunity to provide your Subcommittee with additional information and commend you for your leadership and bipartisan approach to this tremendously important issue for our nation and for our military forces.

Throughout this process, the GPS industry has sought to be cooperative in helping arrive at a factual, engineering-based understanding of the interference problems that would be caused if LightSquared's plans were to be implemented. Engineers and issues experts from throughout the industry joined together to participate in the extensive tests of LightSquared's original proposal, and the industry stands ready to assist in whatever manner is most helpful for future testing.

LightSquared should do what the FCC and NTIA have said and prove through more testing that it can actually solve the interference problem and that replacement equipment will actually work. And where it cannot resolve the significant interference concerns for existing GPS devices already in the hands of government and private users, it should pay the full costs of any transition process and any replacements or retrofits required. This should include the full costs that the Department of Defense would have to bear to upgrade the receivers in its inventory and to assure no degradation to the performance of the best military weapon systems in the world and no undue risk to the safety of our nation's brave airmen, marines, sailors, and soldiers whom we routinely ask to go into harm's way. It is time for LightSquared to stop the misinformation campaign and do the hard work needed so that this country can have both broadband and GPS.

Thank you for your interest in this matter. If you have any questions, please let me know.

Sincerely,

James A. Kirkland
Vice President and General Counsel